INTRODUCTION

Mucinous cystic neoplasm (MCN) and intraductal papillary mucinous neoplasm (IPMN) are the two most common mucinous lesions in the pancreas. Recognition of these mucinous lesions preoperatively is important due to their potential association with variable dysplasia and even invasive carcinoma. Since the patients with invasive MCNs are 5-10 years older than the patient with noninvasive MCNs, suggesting that progression from a noninvasive curable neoplasm to an invasive cancer occurs over a period of years. Similar findings are also seen in the patients with IPMNs.

With advances in imaging techniques, more and more pancreatic lesions are identified. Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) biopsy is becoming the choice of modality for diagnosing and classifying pancreatic lesions. However, accurate diagnosis of pancreatic lesions, especially cystic lesions, could be difficult based on cytomorphologic features alone due to low cellularity and overlapping cytopathology. Previous studies have demonstrated that carcinoembryonic antigen (CEA) level analysis of cystic fluids could be helpful in differentiating mucinous from non-mucinous cysts. KRAS mutation has been implicated in pathogenesis of pancreatic neoplasms and KRAS mutation testing can improve diagnostic yield in cases with indeterminate cytopathological diagnoses.

In this retrospective study, we review the results of cytological diagnosis, CEA level and KRAS mutation status in MCNs and IPMNs diagnosed by cytopathology examination.

MATERIALS AND METHODS

The institutional database was searched for all cases with a diagnosis of pancreatic lesions by EUS-FNA biopsy with surgical follow-up of either MCNs or IPMNs at Yale-New Haven Hospital between January 2005 and June 2011. A total of 61 cases were retrieved from cytopathology and histopathology archives, of which 25 cases (41%) were MCNs and 36 cases (59%) were IPMNs. Patient’s clinicopathologic features of MCN and IPMN cases included in this study were retrieved from cytopathology and histopathology archives, of which 25 cases (51%) were MCNs and 36 cases (68%) were IPMNs. In some cases, part of the aspirates were sent for cyst fluid analysis including CEA level. A CEA level of more than 192 ng/ml was considered as elevated, suggesting a malignant lesion.

RESULTS

1. Clinicopathologic Features (Table 1)
The patients were 21 males and 40 females with ages ranging from 27 to 82 years old. The pancreatic lesions included 25 MCNs with low, intermediate and high grade dysplasia in 21, 1, and 3 cases, respectively. In the 36 IPMNs with low, intermediate, and high grade dysplasia in 17, 10, and 9 cases, respectively. The majority of the lesions (59%) were located in the head, neck or uncinate of the pancreas. Other locations included the body (15%) and tail (26%). The lesions ranged from 0.4 to 12 cm, with a mean of 3.6 cm.

2. Cytological Diagnoses (Table 2)
For the cases of MCNs, the cytological diagnoses of negative, suspicious or positive for mucinous neoplasm, and adenocarcinoma were rendered in 14 (56%), 8 (32%) and 3 (12%) cases. For the cases of IPMNs, the cytological diagnoses of negative, suspicious or positive for mucinous neoplasm, and adenocarcinoma were rendered in 10 (28%), 4 (11%) and 6 (17%) cases.

3. CEA Level and KRAS Mutation Status (Table 2)
Cyst fluid analysis of CEA was performed in 14 of 25 (56%) MCNs and 7 of 36 (19%) IPMNs. Using the cutoff of 192 ng/ml, CEA level was elevated in 11 of 14 (79%) tested MCNs and 6 of 7 (86%) tested IPMNs. KRAS mutation was identified in 7 of 13 (54%) tested MCNs and 8 of 15 (53%) tested IPMNs.

4. Sensitivities of Cytomorphology, CEA Level and KRAS Mutation Analysis
Based on cytomorphic features, mucinous neoplasm was recognized in 11 of 25 MCN cases (44%) and in 20 of 36 IPMN cases (72%) including a malignant diagnosis in 3 MCNs and 6 IPMNs. By combining cytomorphic features with CEA level and KRAS, the sensitivity for identification of mucinous neoplasm was increased from 44% to 68% in MCNs and from 72% to 83% in IPMN cases.

CONCLUSIONS

- Mucinous cystic neoplasm (MCN) and intraductal papillary mucinous neoplasms (IPMN) have different clinicopathologic characteristics and are associated with variable degree of dysplasia.
- EUS-FNA has a higher sensitivity for identifying IPMNs than MCNs based on the analysis of cytomorphologic features alone. KRAS mutation testing increases the sensitivity of EUS-FNA especially for MCNs and should be incorporated into the final diagnosis of EUS-FNA.

REFERENCES